NEWS RELEASE

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Scientists Make Rain in Mexico

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BOULDER -- Producing more rain by seeding clouds may no longer be wishful thinking. After many failed attempts by scientists to duplicate cloud-seeding experiments that appeared to have worked in the past, a team from the National Center for Atmospheric Research (NCAR) believes it has finally succeeded in increasing rainfall in existing storm clouds and quantifying the results. The findings are being presented this week at the American Meteorological Society's annual meeting in Albuquerque.

A recent three-year randomized experiment in the northern Mexican state of Coahuila showed that rainfall from seeded clouds lasted longer, the rainfall area was larger, and total precipitation was higher (sometimes even doubled) than output from similar nonseeded clouds. In many cases the results of the seeding were statistically significant 20 minutes to an hour after seeding.

The Mexico project was designed to repeat the success of a groundbreaking, five-year effort conducted in South Africa in the early 1990s. The new study, which followed several years of drought in northern Mexico, was funded by the Mexican state of Coahuila with financial support from Altos Hornos de Mexico, a private steel company. NCAR's primary sponsor is the National Science Foundation.

NCAR researchers flew into the Mexican rain clouds in a Piper Cheyenne twin-engine turboprop airplane, equipped with wing-mounted racks carrying 24 hygroscopic flares and an instrument package to measure basic cloud physics indicators. The flares spewed salted smoke into the moisture-rich updrafts entering the clouds from below. The tiny particles (a mixture of sodium, magnesium, and calcium chlorides) attracted and absorbed the surrounding water vapor to more readily create large drops heavy enough to fall out as rain.

"We are very encouraged by the results," says lead scientist Roelof Bruintjes of NCAR. However, the number of cases is marginal for any statistical analysis, he adds. Funding for a planned fourth year of data gathering was cut when the Mexican drought ended. This left the total number of cases at 94, compared to 127 in the South Africa study. The team is optimistic that more seasons in the field will extend the results and help establish statistical significance.

Even more problematic is that scientists cannot fully explain how the seeding process works inside the cloud. "We must be able to explain both microphysical and dynamical responses of the cloud to the seeding procedure," cautions Bruintjes, "before we can claim full success."

The main tool for "nowcasting" the weather and for evaluating the seeding experiment was a 5-cm wavelength weather radar. Special software developed at NCAR displayed the radar data and the aircraft position in real time for directing operations. It also objectively identified storms for evaluating the results.

NCAR is managed by the University Corporation for Atmospheric Research, a consortium of more than

65 universities offering Ph.D.s in atmospheric and related sciences.

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Airborne hygroscopic flares send water-attracting particles into rain clouds. Photo courtesy of the National Center for Atmospheric Research.

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